

8 July 1985

## Operations

### TRACKING AND IMPACT PREDICTIONS (TIP)

This regulation sets up procedures and guidance for collecting, processing, and reporting data on space objects generally greater than 1 square meter in radar cross section prior to reentry through the earth's atmosphere and final decay trajectory. It applies to HQ NORAD, ADCOM, and Space Command; NORAD Space Surveillance Center (NSSC); and Alternate NSSC (ANSSC).

1. **General.** Satellites in the earth's orbit which survive reentry through the atmosphere could cause damage on impact or could generate an indication of a missile threat in US or USSR warning systems. The TIP program provides predictions of possible areas of impact for decaying satellites and allows notification to the National Military Command Center (NMCC) in support of Article 3 of the 1971 Agreement on Measures to Reduce the Risk of Outbreak of Nuclear War Between the US and USSR.

#### 2. Definitions:

a. **Orbit Decay.** The gradual reduction of a satellite's orbital altitude attributable primarily to atmospheric drag.

b. **Normal Decay Object.** A small piece of satellite debris that is not expected to survive reentry through the atmosphere and impact the earth. These objects are normally less than 1 square meter in radar cross section.

c. **TIP Object.** A payload, rocket body, or large piece of debris processed under the TIP program because it may survive reentry through the atmosphere and impact the earth. These objects are generally greater than 1 square meter in radar cross section.

d. **Decay Window.** A time interval of uncertainty about the final decay trajectory. The decay window is calculated as  $\pm 20$  percent of the time difference between the time of the last observation and the predicted final decay trajectory time. When verified by a visual sighting, the decay window for the final prediction is  $\pm 1$  minute. Historically, this gives 95 percent confidence that the final prediction is within the stated decay window for intermediate predictions

(for example, 10 days to 2 hours prior to decay). For the final prediction, the  $\pm 20$ -percent decay window is a 68-percent confidence that the actual final decay trajectory is within the stated window.

e. **Significant Space Event.** A TIP object determined to be reportable to the NMCC such as:

(1) Any TIP decay which occurs over or within 100 nautical miles of the USSR at any time  $\pm 15$  minutes from the 6-hour or 2-hour decay point window.

(2) Any breakup, into five or more pieces, of a decay (TIP) satellite whose inclination is such that it overflies the USSR.

f. **Sixty-Day Decay Prediction.** A final decay prediction on the general perturbations element set of a satellite. These predictions determine which objects will enter final decay within the next 60 days, when final decay will occur, and when to initiate TIP procedures on a TIP object.

#### 3. Policy:

a. Authority for policy is vested in CINC-NORAD/CINCAD for the TIP program.

b. HQ NORAD/J31SS and NSSC implement and administer the TIP program.

#### 4. Responsibilities:

##### a. HQ Space Command/DOS:

(1) Develops and publishes policy and guidance on TIP support.

(2) Annually reviews and, if required, updates this regulation.

Supersedes N/A/A Regulation 55-17, 15 July 1980. (For summary of changes see page 3.)

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b. HQ Space Command/PA. Handles all public requests for TIP object information.

c. HQ NORAD/J31SS:

(1) Develops and publishes crew-procedures for accomplishing required predictions, reports, and notifications per this regulation.

(2) Prepares and sends these messages:

(a) Sixty-day decay prediction message which has NSSC-predicted decays and NAVSPASUR and Royal Aircraft Establishment (King Hele) decay predictions.

(b) Additional TIP information message which is done weekly and covers a 10-day period for special interest types of satellites:

1. Known to contain nuclear materials.

2. Of high interest to other military or civilian organizations.

(3) Implements procedures and sensor tasking on TIP objects by 12 days prior to the predicted final decay trajectory date.

(4) Records and maintains TIP data:

(a) On each TIP prediction for 30 days and then sends it to HQ Space Command/KRSSA (Historical Data System) where two microfiche copies are made for permanent retention. HQ Space Command/KRSSA keeps one copy and sends one back to J31SS.

(b) On a computer data base hard copy of all historical TIPs to include satellite number, decay date and time, latitude and longitude of reentry, and inclination. Sends a copy to HQ Space Command/PA.

(5) Provides HQ Space Command/PA with TIP information as requested.

d. J31SS and NSSC:

(1) Prepare and send TIP specified in c(2) above and e(1) below to addressees listed in attachment 1.

(2) Provide sensor sites with tasking and data per N/A/SR 55-12(S). Also provide other data as needed to ensure the best acquisition probability.

e. NSSC:

(1) When possible, uses these special perturbation methods for making TIP:

(a) 7-10 days prior to predicted final decay.

(b) 4 days prior to predicted final decay.

(c) 2 days prior to predicted final decay.

(d) 1 day prior to predicted final decay.

(e) 12 hours prior to predicted final decay.

(f) 6 hours prior to predicted final decay.

(g) 2 hours prior to predicted final decay.

(h) Post decay.

(2) Provides updated TIP vectors to the ANSSC by voicetell or message, starting with the 2-day prediction.

(3) Reports and updates information on significant space events by an OPREP-3 PINNACLE message in support of Article 3 of the 1971 Agreement on Measures to Reduce the Risk of Outbreak of Nuclear War Between the US and USSR. NOTE. Sends to the ADCOM Command Post.

(4) Notifies by message FTD/SDM at Wright-Patterson AFB OH when indication is received that a TIP object or any decayed man-made satellite has been recovered. Additionally, correlates the recovered object with satellites in TIP status and provides the information to FTD/SDM.

(5) Evaluates launch and impact or reentry events for possible correlation against a TIP object.

f. ANSSC. Maintains the capability and current information required to assume TIP operations should the NSSC become unable to perform its mission.

OFFICIAL

JAMES H. RIX  
Colonel, USAF  
Director of Administration

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General, USAF  
Commander in Chief

1 Attachment  
Addressees for TIP Messages

## SUMMARY OF CHANGES

New definition for significant space event added (paragraph 2e). Changes name of normal decay prediction to the 60-day decay prediction (paragraph 2f). Gives authority for publishing policy on TIP support to Space Command/DOS (paragraph 4a(1)). Procedures for TIP implemented 12 days prior to predicted decay instead of 14 days (paragraph 4c(3)). Updates TIP addressees for TIP messages (attachment 1).

## DISTRIBUTION: X

HQ USAF/XOSO, The Pentagon, Washington DC 20330 .....	1
OJCS/J36/CCD/NMCC, The Pentagon, Washington DC 20301 .....	3
Western Space and Missile Center/ROPA, Vandenberg AFB CA 93437 .....	1
NAVSPASUR ANSSC, Dahlgren VA 22448-5180 .....	5
HQ FTD/SDM, Wright-Patterson AFB OH 45433-6508 .....	1
318 FIS/DOA, McChord AFB WA 98438 .....	1
3430th Tech Training Group, Bldg 959 West, Lowry AFB CO 80230 .....	1
Canadian NORAD Region/PDO, Hornell Heights, Ontario CN POH 1PO .....	1
HQ Space Division/IND, P O Box 92960, Worldway Postal Center, Los Angeles AFS CA 90009-2960 .....	1
National Defence HQ, ATTN: NDOC/DSTI, Ottawa, Ontario CN K1A OK2 .....	2
NASA, GSFC/Codes 512 and 601, Greenbelt MD 20771 .....	2

## ADDRESSEES FOR TIP MESSAGES

## A1-1. All Predictions:

OTTAWA ONTARIO CANADA//NDHQ/NDOC//  
HQ USAF WASH DC//XOSO//  
NAVSPASUR ANSSC DAHLGREN VA//  
CMC BUF PETERSON AFB CO//J31B//  
NASA GSFC GREENBELT MD//CODE 512//  
AFSCF SUNNYVALE AFS CA//ROSR//  
DET 1 SAMTO CAPE CANAVERAL AFS FL//RODN//  
CIA WASH DC//OWI/AVAD//  
DEFSMAC FT GEORGE G MEADE MD//  
DIA WASH DC//  
JCS WASH DC//NMCC/J3//  
HQ SPACECMD PETERSON AFB CO//DOS//

## A1-2. 6- and 2-Hour Messages:

6 MWS OTIS AFB MA//DO//  
7 MWS BEALE AFB CA//DO//  
2 CS BUCKLEY ANG BASE CO//SD//  
5 DSCS WOOMERA AS AT//SD//  
HQ SPACECMD PETERSON AFB CO//PA//  
16 SURS SHEMYA AFB AK//DO//  
19 SURS PIRINCLIK TURKEY//DO//

## A1-3. Post Decay Message:

FTD WRIGHT-PATTERSON AFB OH//SDS//  
16 SURS SHEMYA AFB AK//DO//  
2 CS BUCKLEY ANG BASE CO//SD//  
CSAF WASHINGTON DC//INYF//  
HQ SPACECMD PETERSON AFB CO//PA//  
DEPT STATE WASH DC//PM/INR//  
AN FPQ-14 RADAR SITE ANTIGUA-LEEWARD ISLAND//  
5 DSCS WOOMERA AS AT//SD//